Future Food Education Modules

Teacher's Guide Years 7-8





Educational Modules

Future Foods

Bunjil Place have teamed up with multisensory experience designers, Post Dining, to develop four "Future Food" modules based on the themes of Casey Cornucopia, exploring the food systems of the Casey region.

The modules encourage students to consider issues of food security in building a sustainable future. They will be encouraged to incorporate design thinking, scientific analysis and the creative arts to re-imagine food systems and what we put on our plates!

The four modules for year levels 1-8 include:

- 1. Food Waste
- 2. Water Footprint of Foods
- 3. Future Proteins
- 4. Local Native Foods

We hope you enjoy this adventure into our culinary future...

Bon voyage!



Hodule 1: Technology and Food Waste





Year 7-8 Future Food Education

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<u>This module has an</u> <u>accompanying powerpoint</u>

Curriculum Links

Cross Curriculum Priorities

Sustainability

Year 7-8 Content: Design and Technologies

Knowledge and Understanding | Technologies and societies | <u>AC9TDE8K02</u>: analyse the impact of innovation and the development of technologies on designed solutions for global preferred futures

Knowledge and Understanding | Food and fibre | <u>AC9TDE8K04</u>: analyse how food and fibre are produced in managed environment and how these can become sustainable

Knowledge and Understanding | Food specialisations| <u>AC9TDE8K05</u>: analyse how properties of foods determine preparation and presentation techniques when designing solutions for healthy eating

Processes and production skills | Evaluation | <u>AC9TDE8P04</u>: develop design criteria collaboratively including sustainability to evaluate design ideas, processes and solutions

Learning Objectives

To introduce food technology, and focus on how food technology can help reduce food waste

Learning OutcomeS

- Explain the technology that goes into making our food, with a particular focus on food waste
- Identify the environmental impacts of food waste
- Find ways to reduce food waste at home/in the classroom





SLIDE 1 1-2 min

Introduce Learning Objectives:

To introduce food technology, and focus on how food technology can help reduce food waste.

<u>Outcomes: I will be able to:</u>

- Explain the technology that goes into making our food, with a particular focus on food waste;
- Identify the environmental impacts of food waste;
- Find ways to reduce food waste at home/in the classroom

SLIDE 2-5 5-7 min



Introduce Food Technology:

"Technology designed to increase the effectiveness of food production, harvest, preparation, and waste disposal."

Activity: Think about your favourite food

• Ask students to close their eyes and think about their favourite food. LEADING QUESTIONS: Was this around 100 years ago? Do they think it will be around 100 years from now? What technologies might have gone into making this food?

Whole class discussion:

- Ask students to open eyes and discuss their favourite foods with the class, picking out a few different types of technologies that went into creating them;
- Give examples of what types of technology go into making our food: Farming technology, Packaging technology, Storage technology, Cooking technology;
- Think about how some of this technology we might take for granted now, and what technology we might imagine into the future...







SLIDE 6-9 5 min



Today we are going to focus on technology to reduce waste

Environmental impact of food waste:

- Australia wastes 7.3 million tonnes of food each year;
- This is the equivalent of 13000 Olympic sized swimming pools, OR one in five shopping bags ending up in the bin;
- This food is not all produced from our homes however, but is a result of waste from farming, food industry and household waste.

<u>Q: Why is food waste a problem?</u>

- In landfill food is trapped without air flow and breaks down anaerobically (without oxygen) which leads to the production of methane gas. Methane is 25x more potent than carbon dioxide;
- Food waste feeds climate change and accounts for 8-10% of global greenhouse gas emissions.

SLIDE 10-11 2 min



How can food technology help us to reduce food waste?

- One example designed for commercial kitchens is artificial intelligence called "Winnow";
- It is a computer than weighs food going into the bin, and uses a camera to identify what kind of food it is;
- It can tally which foods are being wasted and how much it costs;
- Chefs can then order less of those foods, to save waste and save money.

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SLIDE 12 2 min

Introduce activity: COOK, COMPOST, or, CREATE.

Let's start with a game... We're going to go through a few slides and for each one I'm going to call out "cook", "create", or "compost" and you can put your hands up if you think you know what the answer is.

SLIDE 13-16 5 min



<u>Q: BANANA PEEL A: COOK</u> Sometimes we throw away food that we can actually eat!

Edible scraps that could be used to make another meal or snack include:

- Green leaves of carrots and beetroot leaves & stems
- Potato peel, carrot peel, banana peel, pumpkin skin
- Pumpkin seeds
- Stems of broccoli and cauliflower
- Bones of chicken

Q: What could you make from these ingredients?

- Carrot leaf pesto
- Whole of beetroot dip, or wash and add leaves to salads
- Banana peel curry or banana peel 'bacon'
- Soups or stocks
- Crispy Pumpkin skin chips

Commercial:

A commercial example is using the spent grains after the beer brewing process, and turning them into muesli bars – the grains still retain a lot of their nutritional content.

Postdining





SLIDE 17-19 5 min



<u>Q: CELERY ENDS</u> A: CREATE

• Many plants can be re-grown at home from food scraps such as a seed or a top. Has anyone tried re-growing food from scraps? If so, what did you grow?

<u>Vegetables you could re-grow from scraps:</u>

- Spring onions re-grow quickly by putting the white bottoms with roots in a glass of water;
- Root vegetables like carrots and beetroot tops (the part you cut off where the leaves sprout from) will re-sprout new edible greens if placed semi-submerged in water;
- Cos lettuce, bok choy, celery, leeks all re-grow if the bottom is placed in water on a windowsill;

Commercial:

A commercial application is using coffee grounds as a medium to grow mushrooms. There are a few commercial farms doing this, and you can find mushroom kits at Bunnings!







SLIDE 18-19 5 min



<u>Q: MOUDLY BREAD</u> A: COMPOST

- Anything that is unsafe to eat or cannot be used for other purposes should be composted;
- Organic material decays with help from microorganisms such as bacteria, worms and fungi. Key components needed for composting are oxygen, moisture and microorganisms;
- Compost is used as a fertiliser to improve the quality of soil and deliver nutrients (nitrogen, phosphorus and potassium) to plants;
- The micro-organisms in the soil break down the nutrients in the food scraps and turns them into a form of nutrients that plants can absorb through their roots.

<u>Commercial:</u>

A commercial application is the City of Casey Kitchen and Garden bins, which accept all household food waste! These go to commercial composting facilities.

SLIDE 20 15 min



DESIGN your own food technology:

In table groups, ask students to design a new technology which can help reduce food waste. They can draw a visual diagram of their solution and write down specifications. <u>Prompts</u>:

- How could you turn an item of food waste into a new material or product?
- How could you reduce the amount of waste people throw away using artificial intelligence?
- How does this address economic and environmental sustainability?

Set an allocated time and allow time for sharing of solutions with the class.



Design a piece of technology to reduce food waste

Select ONE of the following challenges:

a) How could you turn an item of food waste into a new material or product?b) How could you reduce the amount of waste people throw away using artificial intelligence? This could be on a farm, at a supermarket, a restaurant or cafe, or in people's homes.

Make sure your design addresses environmental, economic and social sustainability.





Nodule 2: Water Footprint





Year 7-8 Future Food Education

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<u>This module has an</u> <u>accompanying powerpoint</u>

Curriculum Links

Cross Curriculum Priorities

Sustainability

> Year 7 Content: SCIENCE

Science and a Human Endeavour | Use and influence of science | <u>AC9S7H03</u>: examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations

Science Understanding | Biological sciences | <u>AC9S7U01</u>: investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys

> Year 8 Content: SCIENCE

Science and a Human Endeavour | Use and influence of science | <u>AC9S8H03</u>: examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations

Learning Objectives

To recognise that different foods have varying water footprints

Learning Outcomes

- Define water footprint
- List foods with a low water footprint
- Describe what factors affect a food's water footprint









<u>Introduce Learning Objectives:</u>

To recognise that different foods have varying water footprints.

Outcomes: I will be able to:

- Define water footprint;
- List foods with a low water footprint;
- Describe what factors affect a food's water footprint.

<u>QUESTION:</u> Can anyone tell me what water footprint means? <u>Prompt</u>: have you heard of carbon footprint?

SLIDE 2-5 12-15 min



Introduce Water Footprint:

"The water footprint of a product is the volume of freshwater used to produce the product measured over the full supply chain."

ACTIVITY: Think about your favourite food

• Ask students to close their eyes and think about their favourite food. LEADING QUESTIONS: Think about where this food comes from and how it is farmed or produced. How much water do you think goes into making this food?

DISCUSSION:

- Ask students to open eyes and ask a few volunteers to share their favourite foods with the class and where water is used in the process of producing it;
- Give examples of where water comes into the process: growing, farming, producing.







SLIDE 6 2 min



Discuss water footprint:

When we talk about the water footprint of a food, we think about the amount of water that it takes to GROW, FARM and PRODUCE the food.

<u>Deep Dive:</u>

Water footprint is made up of green, blue and grey water.

- Green water: rain water;
- Blue water: surface and groundwater reservoirs (irrigation water);
- Grey water: fresh water used to dilute any pollution created during the production process.

SLIDE 7 2 min



Environmental Impact:

- Food production is a water intensive process: During the period 1996-2005, agricultural production contributed to 92% of the total global water footprint (Mekonnen & Hoekstra, 2011);
- Therefore, the food system is a valuable place to make changes to our global water usage for a sustainable future.
- One third of water used for animal production is for the beef cattle sector; another 19% for the dairy cattle sector. Most of the total volume of water (98%) refers to the water footprint of the <u>feed</u> for the animals.

<u>REFERENCE</u>:

<u>https://waterfootprint.org/en/water-footprint/product-</u> water-footprint/water-footprint-crop-and-animal-products/





Module 2: Water Footprint



SLIDE 8-9 15 min



Activity: Which food product has the highest footprint?

- In table groups ask students to rank Beef, Chicken, Kangaroo and Chickpeas in order of Highest - Lowest water footprint;
- Choose a table to share their answers and ask what went into their reasoning.

<u>Reveal answers & ask students to write CORRECT answers</u> <u>on their worksheets:</u>

- Beef (15400L of water per 1 kilo of beef)
- Chicken (4300L per 1 kilo)
- Kangaroo (~3000L per 1 kilo) (estimates as figures haven't been measured)
- Chickpea (1300L per 1 kilo)

SLIDE 10-12 5 min



Explore HIGH water footprint:

- Farmed animals require farmed feed AND drinking water to live;
- 98% of water footprint for farmed animals comes from the water footprint of their feed!
- Cows require more food and more water because they are significantly larger than chickens.







SLIDE 13-16 5 min



What makes a LOW water footprint?

Overall, plants need less water than animals as they get most of their energy from the sun rather than other plants.

Other foods with low water footprint

- Fruits and vegetables
- Grains and cereals like oats, wheat for bread
- Legumes like baked beans, chickpeas, lentils
- Eggs

Exception: nuts have a high water footprint as these trees and crops require a lot of water

<u>Why do Kangaroos have a lower water footprint than other</u> <u>large animals and other red meats?</u>

- Indigenous to Australian environment, where there's less water;
- Kangaroos rely on native scrub, hence, farmers do not have to grow feed for them. They also typically eat less than livestock;
- Don't need a lot of water as their intestines reabsorb/recycles water passing through their body;
- This is compared to other livestock who do not recycle water in their body and need to drink much more water than a kangaroo;
- Can go months without drinking any water at all.

SLIDE 17 -BONUS ACTIVITIES

Discuss altenate low water footprint foods:

- Seaweed no freshwater required for farming or drying
- Native plants many adapted to dry environments
- Edible insects small & short lifespan therefore very little water needs, often obtain water from food sources

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• Wild camel - adapted to deserts

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THE WATER FOOTPRINT OF FOOD

Q: Draw a diagram that shows at least 4 steps in the process of producing your favourite food. Label on the diagram where water is used and what it is used for:

HINTS: think of growing plants/animals, drinking water for animals, cleaning and washing food items after they are harvested, processing factories,

Q: Why do animal foods tend to have a higher water footprint than plant foods?

Q: Name two reasons kangaroos have a lower water footprint than other mammals?

1	
2.	



Q: List 3 protein foods which have a low water footprint and 3 protein foods which have a high water footprint?

1	
2	
3	
4	
5	
6	

Q: Animals foods have a higher environmental cost than plant foods, not just their water footprint but also their carbon footprint...

Discuss 2 positive and 2 negative impacts on society if all Australians were to turn vegetarian. Impacts could include environmental, economic, physical (health), social or cultural.



Module 3: Future Proteins





Y7-8 Future Food Education Modules





<u>This module has an</u> <u>accompanying powerpoint</u>

Curriculum Links

Cross Curriculum Priorities



> Year 7 -8 Content: Health and PE

Personal, social and community health | Making healthy and safe choices| <u>AC9HP8P10</u>: plan and implement strategies, using health resources, to enhance their own and others' health, safety, relationships and wellbeing

Learning Objectives

To identify protein sources from unconventional food sources

Learning Outcomes

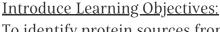
- Define protein
- List foods with high protein content
- Identify and name edible insects







SLIDE 1 2 min



To identify protein sources from unconventional food sources.



- Define protein;
- List foods with high protein content;
- Identify and name edible insects.

SLIDE 2-7 15 min



What is protein? Why is protein important?

"Protein is an essential nutrient. It is commonly found in animal foods, but is also found in plants such as nuts and legumes."

ACTIVITY: Name Protein Foods:

- Animals proteins: any meat, poultry, fish or dairy product, eggs;
- Plant proteins: any legumes/beans/lentils, nuts and seeds, tofu/tempeh/seitan, protein powder,

Ask students if they know why protein is important?

- For growth;
- To build and maintain muscle strength;
- To help our body produce enzymes and hormones;
- For structure: bones, skin, hair, nails.





Module 3: Future Proteins



SLIDE 2-7 15 min



Why is protein important? CONT.

<u>How much protein do we need? (Australian Guide to Healthy</u> <u>Eating</u>)

- 65g cooked lean red meats (about 90-100g raw)
- 80g cooked lean poultry (100g raw)
- 100g cooked fish fillet (about 115g raw) or one small can of fish
- 2 large (120g) eggs
- 1 cup (150g) cooked or canned legumes/beans
- 170g tofu
- 30g nuts, seeds, peanut or almond butter or tahini or other nut or seed paste

SLIDE 8 2 min

ACTIVITY: Introduce "Who Am I" game Explain that you will read out a list of "Who am I" questions. Students asked to raise their hand and guess what the alternative protein source might be.





Module 3: Future Proteins



SLIDE 9-11 5-7 min



Who Am I #1: Crickets

- 1.I am excellent source of protein that does not need to be refrigerated;
- 2.I can be eaten whole or ground up into a powder;
- 3.I am small and usually brown in colour;
- 4. My exoskeleton is rich in a fibre and calcium;
- 5.I chirp loudly;
- 6.I feed on grasses and plants;
- 7.I am a cricket!

More about edible crickets:

- Crickets are an excellent source of protein that once roasted, have a shelf life for 6 months;
- Ground cricket powders contain around 65% protein, which means a 20g snack size serve contains 12g protein;
- Whether eaten whole or ground, the exoskeleton is consumed, which is why crickets are an excellent source of calcium, which means ~ a 50g serve of crickets gives you as much calcium as one cup of milk. The exoskeleton is also rich in a fibre which helps to feed the healthy bacteria in your gut.

SLIDE 12-15 10 min



Who Am I #3: Mealworms

- 1.I contain 50-70% protein;
- 2.I am delicious and crunchy when roasted;
- 3.I am very small, and I have a long brown body;
- 4. If you don't eat me, I will turn into a beetle;
- 5. You might have seen me as feed for reptiles, chickens or as fishing bait, but humans can eat me too!

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- 6.I live on the ground and like dark places;
- 7.I am a mealworm!



Module 3: Future Proteins



SLIDE 12-15 10 min



More about edible mealworms:

- Mealworms are the larval form of the darkling beetle, and are commonly used as feed for reptiles, chickens or as fishing bait.
- They are really high in protein, between 50-70% when roasted. In comparison, chicken, beef and pork contain 20-30% protein. Mealworms also contain small amounts of most other minerals and vitamins necessary for humans.
- As with all insects, mealworm's outer skin is an important prebiotic fibre for gut health - something you won't find in any animal meats. Prebiotic foods are not absorbed into our gut, but instead provide a food source for the healthy bacteria living in our gut.

Closed-Loop Farming:

Mealworms are very suitable for closed-loop farming systems - which is something we need to consider for humans to live in space.

They are more efficient at turning plant feed into protein compared to larger animals like chickens or cows. They can also eat many different waste sources, such as plant and vegetable scraps that humans cannot digest. They get all the moisture they need from plant foods. The small amount of waste they excrete, called frass, is an excellent fertiliser for plants and can be recycled back into the closed-loop system.

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Module 3:

Future Proteins



SLIDE 18-20 8 min



QUESTION: Why would we eat bugs?

Around the world people have been eating insects for centuries. People in 130 countries around the world eat insects all the time - there are nearly 2000 known edible species. By introducing insects as a sustainable protein source in Australia, we're not ahead of the times, we're actually behind!

Insects require far less land, water and feed than livestock to produce the same amount of food. Crickets for example, are 20 times more efficient at converting food to protein than cows. Insects can be raised almost anywhere, require very little space, and can even be raised at home and fed table scraps and weeds from the garden. They also reproduce within weeks - much faster than animals. They are also delicious!

As our population increases and demand for protein rises, bugs are one way we can meet our protein needs in a sustainable way.

BONUS: Offer your students edible insect tastings: Purchase some snack crickets or mealworms from Circle Harvest <u>https://circleharvest.com.au/</u>

SLIDE 21 1 min WARNING - DO NOT GO AND EAT BUGS YOU FIND IN THE GARDEN. THESE ARE NOT SAFE TO EAT. ONLY EAT BUGS IF THEY HAVE BEEN COOKED BY AN ADULT AND ARE BEING SERVED AS FOOD.



Name:		

FUTURE PROTEINS

Q: Name 3 functions of protein in the body?

1		
2		
3		

Q: Name 5 animal sources of protein and 5 plant sources of protein?

1	_1
2	2
3.	3.
4	
5	۲
J	

Q: How many countries in the world eat insects? _____

Q: Name two key nutrients other than protein found in crickets, and which part of the insect are they found in?

1			
2.			

Q: Describe closed-loop farming and draw a diagram of the mealworm life cycle to demonstrate it.



Q: Discuss why insects might be a more sustainable protein source for Australians in the future compared to traditional farmed animals like beef, pork and chicken?

Q: Why do you think people find the idea of eating insects 'icky'? Do you think it's possible to change people's minds, and why?

Module 4: Native Foods





Year 7-8 Future Food Education





This module has an accompanying powerpoint

Curriculum Links

Cross Curriculum Priorities



Aboriginal and Torres Strait Islander Histories and Cultures

Year 7 Content: History

Knowledge and understanding | Deep Time History of Australia | <u>AC9HH7K03</u>: how First Nations Australians are the world's oldest continuing cultures, displaying evidence of both continuity and change over deep time

Knowledge and understanding | Deep Time History of Australia | <u>AC9HH7K05</u>: the technological achievements of early First Nations Australians, and how these developed in different places and contributed to daily life, and land and water source management

Learning Objectives

Learn about foods native to Bunurong/Boon Wurrung & Wurundjeri Country

Learning Outcomes

- Identify the Indigenous place names of Casey region
- Name and identify local native flora and fauna









Introduce Learning Objectives:

Learn about foods native to Bunurong/Boon Wurrung & Wurundjeri Country.



Outcomes: I will be able to:

- Identify the Indigenous place names of Casey region;
- Name and identify local native flora and fauna.



<u>Q: What do we mean by native food?</u> Native foods are flora (plants) and fauna (animals) that evolved in Australia.

<u>Questions:</u>

- Has anyone tried any native foods?
- Do you remember where you tried them?
- Does anyone know the names of any native foods?

<u>Examples</u>

Top images: lemon myrtle, wattleseed, bush lime Bottom images: saltbush, quandong, bush tomato





Module 4: Native Foods



SLIDE 4-5 10-12 min



Why are native foods not more common in Australian diet?

- For 60,000 years before European colonisation the Casey district was the the land of the Bunurong and Wurundjeri people;
- When Europeans invaded and colonised Australia, they started clearing and farming the land their own way, and forced Aboriginal people to stop speaking their language and practising their culture;
- A lot of the knowledge about native foods was lost.
- Today, very little of the original landscape is left due to farming, building cities and suburbs so there aren't many places for native foods to grow;
- The Bunurong people still play an active role in the protection, preservation and awareness of their culture, heritage and environment through the Bunurong Land Council Aboriginal Corporation.

Bunurong Country

- The Bunurong people are Indigenous people from southeast Victoria. Their traditional lands are from the Werribee River in the north-west, down to Wilson's Promontory in the south-east;
- Bunurong people were part of a language group or nation known as Kulin. Bunurong people prefer to be described as Kulin or Bunurong rather than Koorie, which is a word from another Aboriginal language;
- The Bunurong People were made up of a number of Clans or Family groups. The City of Casey lies within the boundary of the Mayone Bulluk Bunurong.

<u>WATCH THE VIDEO: A Mayone Bullock Story</u> <u>https://www.youtube.com/watch?v=NDZVoG4Treg</u>

For more information visit City of Casey website





Module 4: Native Foods



SLIDE 6-9 7-8 min



ACTIVITY:

- 1. Hand out a map outline of Australia (handout below);
- 2. Ask students to draw in and name all the states and territories including capital cities, from memory!

Show the original Aboriginal map of Australia:

- Each group had a different language and knew in depth about their own local climate and landscape;
- They passed knowledge down generation to generation and looked after their Country;
- By caring for the plants and animals, there was always enough food to go around. Casey is the traditional land of the Bunurong/Boon Wurrung and Wurundjeri people.
 - 3.Write the traditional Aboriginal Countries of the Casey region on the worksheet.

SLIDE 10 5 min



<u>What grows on Bunurong/Boon Wurrung & Wurundjeri</u> <u>Country?</u>

- Water: we are near the beaches seafood such as eels & mussels were found here;
- Plants: inland, plants such as wild yams, and plant roots, native spinach grew;

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• Land animals: birds eggs, kangaroos and possums.



Module 4: Native Foods



SLIDE 10 10 min



ACTIVITY: Draw a chocolate lily onto your map "Chocolate Lily (aka. Nodding Chocolate Lily, Dichopogon strictus) gets its name from its chocolate scented flowers. Its bush food value, however, comes mainly from its juicy tubers, which can be eaten raw or cooked. This species is found in grassland, woodland and forest regions of New South Wales, South Australia, Queensland, Western Australia, Tasmania and Victoria." <u>https://tuckerbush.com.au/chocolate-lily-arthropodium-</u> <u>strictum/</u>

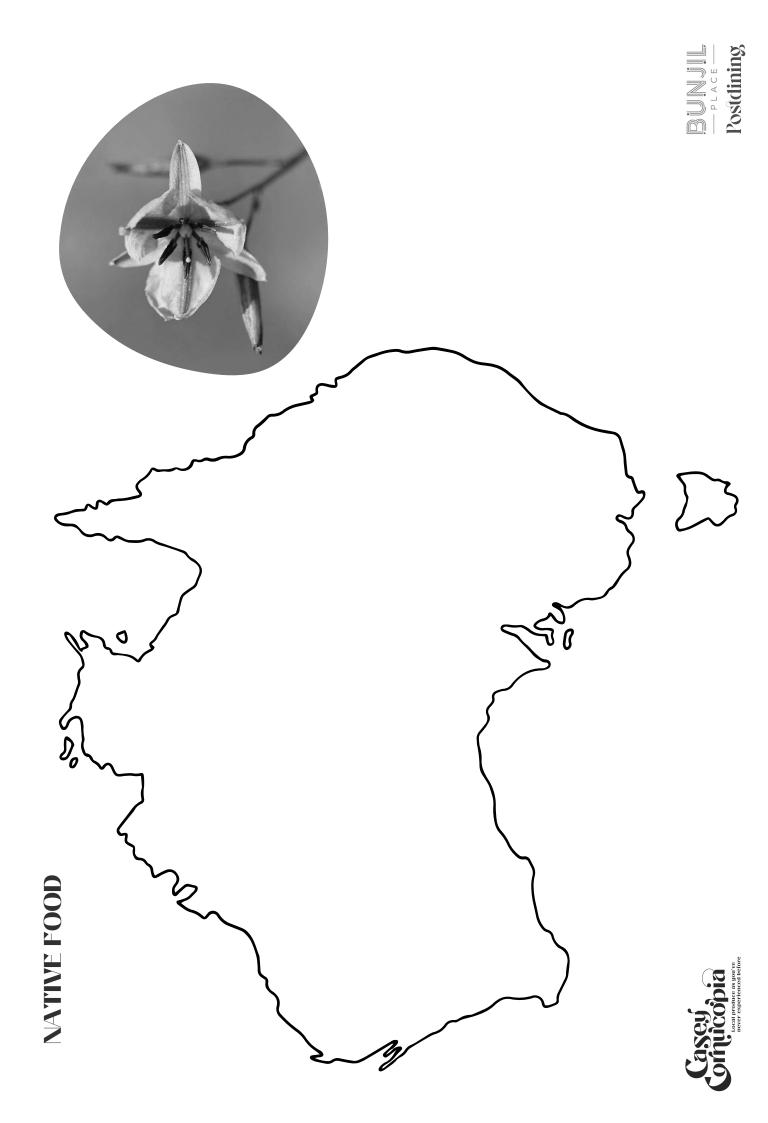
Bonus: Why draw plants?

Through looking closer at plants and taking the time to get to know them better, we also get to know the world around us that much better.

BONUS ACTIVITY

Purchase some native food samples and offer the students to try: <u>https://melbournebushfood.com.au/</u>





Name:		

NATIVE FOOD

Q: What Country are we on?

Q: Name three native foods that grow locally?

- 1._____
- 2._____
- 3._____

Q: Why are native foods not more common in Australian diet?

Q: How did Chocolate Lily get its name, and which part of the plant is most commonly eaten?

Q: Why is it important for us to learn how to identify native foods?

These Future Food Education modules have been designed for Casey Cornucopia by Post Dining.

Postdining

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We design multi-sensory experiences that reimagine the relationship between people, food and the environment. Our designs take the form of immersive performances, exhibitions, workshops, events and festival programming. For Arts Industry, Corporate and Educational groups.

Learn more about ' Post Dining here!